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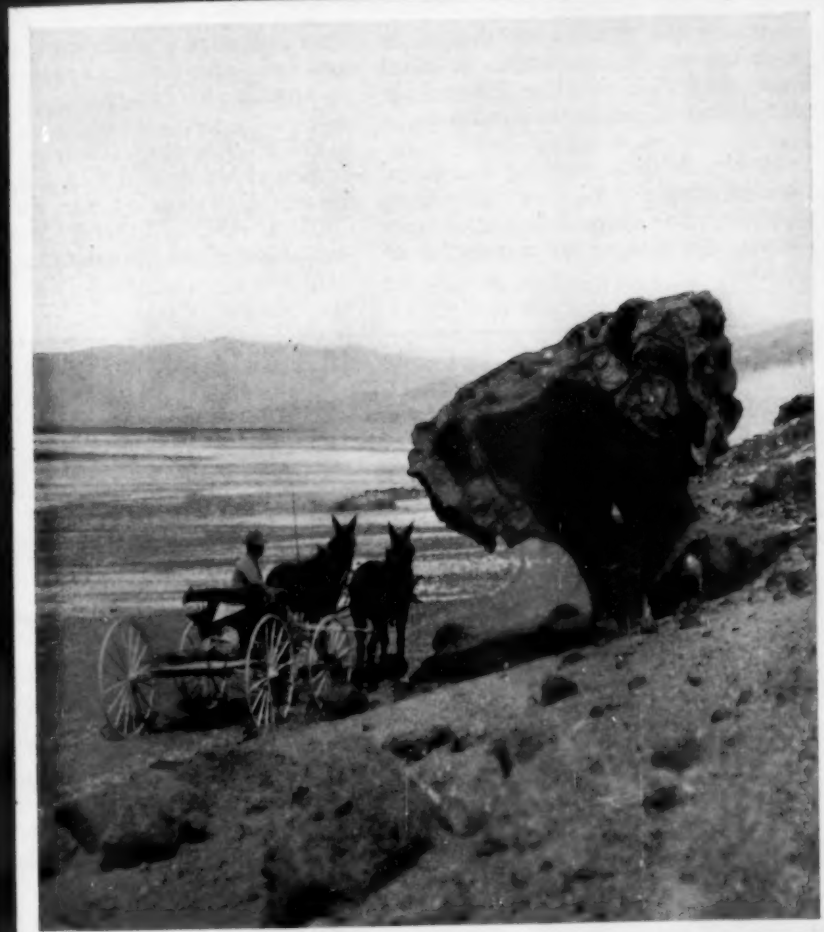
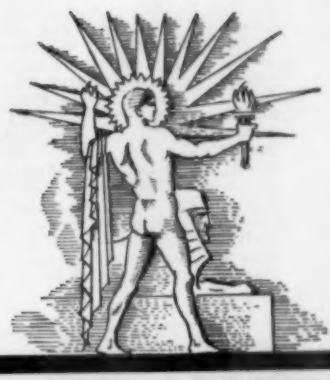
SCIENCE NEWS LETTER

THE WEEKLY SUMMARY OF CURRENT SCIENCE •





AUGUST 1, 1931

On the Edge of a New Mecca for Tourists

See Page 70

A SCIENCE SERVICE PUBLICATION

SCIENCE NEWS LETTER

VOL. XX *No. 538*

The Weekly Summary of Current Science

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SCIENCE SERVICE

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DO YOU KNOW THAT

Hurricanes usually originate in the ocean.

Evidence that the ancient city of Kish, in Mesopotamia, had some contact with the advanced civilization of India almost 5,000 years ago is obtained in the form of a seal bearing hieroglyphics of Indian type found deeply buried at Kish.

Russia expects to have the world's largest scrap iron yard.

The Smithsonian Institution at Washington has among its possessions the first portrait taken upon a color plate.

Among the picturesque fishes of an aquarium are the sea robins, so called because of their winglike fins and the prominence of red in their coloring.

A big electrical company has found that reducing the thickness of its filing cards by a hair's breadth has saved space in its offices equal to a roomful of desks.

Borrowing an idea from the western rodeos, Alabama has a deep-sea fishing rodeo each summer.

Federal chemists will soon start work in a new laboratory in Florida where they will study methods of preserving orange and grapefruit juice, of developing orange and grapefruit by-products, and of utilizing orange and grapefruit wastes as stock and poultry feed.

A new sound absorbing material made of lava bonded with Portland cement may prove effective in muffling the noise of subway trains.

It is only a few centuries since travelers in Europe carried their own knives and forks with them, not expecting inns to provide such luxuries.

Of all European countries Bulgaria is most richly stocked with game, partly because little hunting was done under Turkish rule, and partly because the mountains afford natural sanctuaries for wild life.

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Science Service presents over the radio, an address

WHAT AN ATOM LOOKS LIKE

By Dr. A. H. Compton, University of Chicago, Nobel Prize Winner for Physics in 1927 and one of world's foremost authorities on X-rays.

Friday, August 7, at 2:45 P. M. Eastern Standard Time

Over Stations of

The Columbia Broadcasting System

BACTERIOLOGY

Germs Lose and Gain Visibility By Changing Their Diet

Discovery, Hailed as Greatest Since Pasteur, Makes Many Disease Germs Visible For First Time

PROF. ARTHUR I. KENDALL

His work means that some of the most menacing diseases may come within man's control.

GIVING germs human proteins to eat is the key to the revolutionary experiments by which Prof. Arthur I. Kendall of Northwestern University Medical School has made invisible germs visible and caused visible ones to vanish into filterable viruses.

This work, hailed as the greatest stride that bacteriology has taken since the days of Pasteur, indicates that many, possibly all, of the germs we know can change from visible to invisible and back again, according to what they feed on.

Feed on Proteins

It has hitherto been impossible to cultivate the invisible germs of such diseases as influenza, smallpox and measles outside living bodies. Prof. Kendall believed this to be due to the fact that all laboratory workers offered them the wrong kind of food. All traditional germ diets were made of such things as beef tea, gelatin, etc., containing the decomposition or breakdown products of proteins. But in human and animal bodies, natural prey of disease-causing germs, there are almost none of these; germs naturally feed on the pure proteins themselves.

Prof. Kendall undertook to get a high-protein ration for his germs. He took pieces of small intestine, human, dog, pig or rabbit, and after treating them chemically to remove the breakdown products, made a culture fluid with what was left. Planted in this, blood from human "flu" patients caused the fluid to become cloudy. A few drops of this cloudy fluid injected into a rabbit's vein gave the animal all the typical symptoms of the "flu." Transferred from this "K medium," as Prof. Kendall calls his fluid, to the old-fashioned germ foods, the germless fluid soon developed thriving colonies of tiny round germs. These appear to be the visible form of the elusive and long sought influenza germ.

Having induced one invisible germ to come out and become visible, Prof. Kendall tried his hand with others. He also took germs that have hitherto been known only in their microscopically visible form, on old-fashioned culture media, and grew them in his new, high protein cultures. Every one of them turned from visible into invisible form. He filtered the invisible form germs through a porcelain filter so fine that some organic molecules cannot pass through it. He took the fluid that came through and planted it on the old-fashioned germ food again. Colonies of visible germs appeared out of the invisible. He could repeat this process as often as he liked, getting visible germs out of visible virus filtrates, and making the visible forms change back again by planting them in his new form food.

The following germs he lists as having been "put through their paces" from visibility to invisibility and back again: infantile paralysis streptococcus, scarlet fever streptococcus, one form of paratyphoid bacillus, typhoid bacillus, the staphylococcus that causes boils, and the crooked germ that the late Dr. Hideyo Noguchi found in yellow fever patients, as well as the little round germ Prof. Kendall himself found in his influenza cultures. He concludes that possibly all bacteria lead this Dr. Jekyll and Mr. Hyde existence.

A sensational by-product of this research is an insight into the nature of the bacteriophage, the mysterious filter-passing something that kills germs as germs kill us. By planting (*Turn page*)

OCEANOGRAPHY

Strange Whirlpool Believed To be Only Play of Tides

THE STRANGE whirlpool reported off Cape Cod was probably not a whirlpool at all but merely the everyday movement of currents which rip and surge over the shoal areas of George's Bank. This is the opinion voiced to Science Service by Commander G. T. Rude, chief of the division of hydrography and topography of the U. S. Coast and Geodetic Survey. Commander Rude has just returned from a two-weeks inspection tour of the four Survey vessels now engaged in the first complete charting of George's Bank.

"Currents passing from ocean depths over shallow areas must necessarily speed up considerably," said Commander Rude in explaining the occurrence, "and the fact that the water sometimes rises up above the surface in 'tide-rips' may account for the idea of 'whirlpools'".

Commander Rude expressed the belief that such statements as Captain W. E. Parker, of the Coast Survey ship, Hydrographer, who is said to have described the whirlpool, made to the newspapers had been misconstrued.

Commander Rude also said that observation of the "whirlpool" was made at the time of the spring tides when the new moon gives the ocean currents forty per cent. more strength than when the moon is at the quarter. "Thus," he pointed out, "a current of three or four knots moving where the depth is not more than thirty or forty feet is powerful enough to be felt on the side of a Survey vessel but would not, of course, hinder its head-on progress or jeopardize its safety."

filtered "phage" on old type culture media Prof. Kendall obtained good growths of the germs they destroy. Bacteriophage therefore seems to be nothing but the invisible form of the germ it seems to delight in wiping out. Prof. Kendall could produce phage from germs by planting the germs in his new medium.

The behavior of germs in changing from visible to invisible is peculiar. They begin to lose sharpness of outline, growing fuzzy and dim under the microscope. At last nothing but tiny granules remain, which will pass through the fine filters, and grow back into visible germs again. Other granules, too large to pass through the filter, appear none too anxious to resume full-fledged germ form, but in the new medium will do so.

This new knowledge of the changeability of germs can be found in patients in the early state of the disease, but not in the later, though the patients are sicker than ever. But certain puzzling granules have been found in the spinal fluid of such patients, and it now appears quite possible that these may be the half-transformed germs themselves.

Science News Letter, August 1, 1931

ASTRONOMY

Comet Discovery Brings Fame To Melon Patch Worker

While Following Hobby at Night, Japanese Foreman Finds New Visitor to Solar System

DISCOVERY of a comet has lifted Masani Nagata out of his daily routine as an obscure melon patch worker in Imperial Valley of California, and caused his name to become known to astronomers throughout the world. In an exclusive interview a Science Service correspondent learned the story of this latest astronomical discoverer.

When Nagata observed the comet, which has been named after him, he notified hopefully and somewhat apologetically the famous Mt. Wilson Observatory at Pasadena. Astronomers immediately turned a telescope at the location given and verified his discovery. They sent out an astronomical telegram announcing the find.

At observatories throughout the world, where Nagata was an unknown name, the question was asked: "Who is Nagata?" None could answer. Further confusion was caused by the assumption that the comet had been discovered in Japan.

It has been found that Nagata is a foreman on a melon ranch ten miles from Brawley, Calif. During the day while Nagata directs the activities of 20 field workers, he dreams of peering into the heavens through his four month old three-inch telescope. The instrument is a portable refractor which he keeps in the house when not in use. He carries it outdoors when observations are to be made. For more than nine years he used a two-inch telescope. After working under the sun at 110 degrees, he spends the evenings with his telescope.

This 45 year old Japanese has been interested in astronomy since childhood, but not until ten years ago was he able to pursue the study of the stars. His education in astronomy has been only a correspondence school course.

The discovery of the comet came by accident. While searching for the planet Neptune, Nagata found the comet within the field of his telescope. Fearing that it might be an old one, he notified professional astronomers.

Astronomers at large observatories will observe Nagata's comet, compute its orbit, its future path and its distance from the earth. Because Nagata has only a three-inch telescope, he can not take photographs and carry out the intricate orbit computations. While professional astronomers search the sky from high mountain peaks, M. Nagata will continue his work in a melon patch.

The comet has a tail eight times as long as the moon's diameter. A small telescope is needed at the present time to see this visitor to the solar system. The tail is difficult to see with a small telescope, but can be found on astronomical photographs.

The latest position of Nagata's comet as determined at Mt. Wilson on the evening of July 19 is right ascension 10 hours 49 minutes and 22.3 seconds and declination north 9 degrees 58 minutes 12 seconds. It is between seventh and eighth magnitudes and its tail is reported as four degrees long.

There is no hope that Nagata's comet will become visible to the unaided eye.

Orbit computations made at the University of California's Students Observatory under the direction of Prof. R. T. Crawford show that the comet was nearest the sun on June 15. It was then one hundred million miles from the sun. It is now one hundred and sixty-seven million miles from the earth. It is receding from the earth and the sun.

The orbit shows that the comet will be four degrees south of the star Beta Leonis on August 3 and that it is moving eastward two degrees a day.

Science News Letter, August 1, 1931

ASTRONOMY

Nagata Tells His Own Story

I AM PURELY an amateur astronomer. On July 15 about 8:30 p. m. Pacific Standard Time I was observing the planet Neptune with my three-inch telescope which has a thirty-diameter eyepiece of eighty millimeters and an altazimuth mounting. Near one of the stars in the constellation of Leo I found what seemed to be a nebulous hazy star. As I am very familiar with that area of the heavens I was therefore very puzzled and doubtful about what I had seen. Soon the hazy unfamiliar star faded away under the horizon.

The next evening at about 8 p. m., observing the same point, I found the same "star" moved about one degree to the northeast. It seemed to be a comet. As I could not believe that a comet of this brilliance, magnitude seven, could have escaped the eyes of thousands of comet seekers with much more improved and more efficient instruments than mine, I inquired at Mt. Wilson Observatory if such a comet were known. They replied in the negative. Then I pointed out to them the position and . . . they answered me that two photographs they had taken showed the comet.

As I am only an amateur astronomer, I have had no special study or courses

STAR OF EVIL

In the desert, where the struggle to get growth is severe and where there are always hungry and thirsty animal mouths to cut down in a moment what took months to build, plants must needs put on a forbidding and even sinister aspect. This curse of the sun shows itself even in objects of beauty, like the flower of the Stapelia here shown. For all its attractive form, the flower has an almost reptilian texture and coloring, and its odor is so overpoweringly ill that it gives many persons a headache just to smell it. Photo by Cornelia Clarke.

in astronomy in school. Perhaps I inherited my interest in the stars from my father. I am head foreman for one of Sears Brothers, Inc., ranches near Brawley Calif., which grow vegetables and melons.

If this discovery does anything for the good of astronomy, nothing will please me more.

Science News Letter, August 1, 1931

ZOOLOGY

Oysters Open Up When Weather Warms

OYSTERS OPEN UP when the water over their beds grows warmer, and they shut up when it gets cooler, A. E. Hopkins of the U. S. Bureau of Fisheries has discovered. It was previously thought that oysters opened by day and closed at night because of light changes, but Mr. Nelson's experiments indicate that it is the daily changes in water temperature rather than the daily light changes that affect the behavior of the shellfish. The experiments were performed on the oyster of the Pacific coast.

Science News Letter, August 1, 1931

ETHNOLOGY

Vile Indian Brew Believed Linked With Schmerler Murder

The body of Henrietta Schmerler, 23-year-old student of anthropology, was found July 24 in a ravine on the White River Apache Indian reservation. The fact that Miss Schmerler was working among Apache Indians to obtain material for a post-graduate thesis attracted nation-wide attention to the "hazards" of studying Indians at first-hand. Scientists point out that it is not unusual for women to do research among Indians and that the solution of the Apache mystery is to be sought in special circumstances surrounding the case. "As a rule investigators are safer among Indians than in American cities," declared one anthropologist consulted. Science Service asked Arthur Woodward, who cooperated with Miss Schmerler in her work at the reservation, for information regarding her efforts to study the Apaches. Mr. Woodward has just returned to Los Angeles from an expedition into the part of Arizona where the Apache reservation is located.

By ARTHUR WOODWARD
Curator of History, Los Angeles Museum

ACCORDING to statements made by Miss Henrietta Schmerler, 23-year-old student of Columbia University, a few days before her death on the Fort Apache Reservation, Ariz., where she was attempting to gather data on the little known ceremonial and tribal home life of the Apache Indians, her efforts were being balked on nearly every turn by the reluctance of the Indians to give this information.

Miss Schmerler also stated that she had left New York on three weeks notice and without having had time to inform herself sufficiently on the nature of the people among whom she was to work. It is believed by some of her white acquaintances who endeavored to aid Miss Schmerler in her work that this unpreparedness and her well meaning but unversed attempts at working among primitive peoples may have been one of the factors that indirectly led to her death.

At a devil dance held at the White River Agency on July 4 Miss Schmerler experienced considerable difficulties in obtaining desired information and photographs. Ben Wetherill, archaeologist of the Van Bergen-Los Angeles Museum expedition working on an archaeological survey in that region, proffered his aid to the young student, obtaining for her photographs of devil dancers which she desired and was unable to obtain herself. At that time she intimated her despair of being able to work into the graces of the people, but she appeared determined in her efforts to carry on her work which was being done preparatory to the granting of her degree of Ph. D.

Judging from the latest press reports from White River, she was criminally attacked before she was murdered. This brings a new element into the case, that of a vicious sort of a home brew which it is alleged is manufactured in large quantities by some of the Indians. Into the crudely distilled alcoholic drink is placed a decoction made of the roots of the Nimson-weed, a particularly vile narcotic. This drink is said to incite partakers to a frenzy.

It is also alleged that these drinking orgies in the Apache camps take place on Saturday evenings and on Sundays. For that reason curiosity seekers are advised against making tours of the camps along White River at such times. It may be that Miss Schmerler in her ignorance of these drinking bouts attempted to go from her cabin to one of the camps Saturday night or Sunday morning and was either followed or waylaid, assaulted and murdered by some drunken Indian.

It is related that her body was discovered in a ravine near the old Fort Apache military cemetery which is situated on a small hill not far from a group of tepee shaped houses of one portion of the Apache camp which extends for several miles along the river. In this cemetery rest the remains of many United States troopers killed in the Apache wars half a century ago. Rock breastworks along the mountain trails still tell of the Apache ambushes while rusty rifles and moldering bones found in the rocks speak of unknown troopers who failed to report for duty.

Science News Letter, August 1, 1931

METEOROLOGY

The Truth About Death Valley

Perhaps the Hottest Place in the World, Yet Not Without Freezing Nights, Death Valley Becomes a Mecca for Tourist

By FRANK THONE

See Front Cover

HOT? Of course it's hot. Maybe the hottest spot on the map. Any town may claim the dubious distinction of being the hottest place in the country, for a day or so at least, during the weeks when the grain harvesters clatter in the fields and asphalt gets soft and sticky in city streets.

But the thermal capital of the United States will still remain in Death Valley. This strip of desolation in southeastern California holds the highest honors in heat for the Western Hemisphere, and a few years ago, before it was ousted by the sizzlingly-named city of Azizia in North Africa, it was the world's champion mercury-booster.

Death Valley is a deep trough between two mountain ranges. It is something over a hundred miles long and averages ten miles wide. Within less than a hundred miles of Mt. Whitney, the highest peak in the United States proper, it sinks its lowest depression to 276 feet below sea level. This is official measurement; there may be lower spots in the valley still awaiting the surveyor's telescopic eye. For ages it has been the catch-basin of desert streams, and it is claimed was once the scene of geyser action that would have made even Yellowstone look tame; so that there is on its arid floor a vast accumulation of concentrated mineral salts of various kinds, including the famous borax deposits that until a few years ago supplied the world. It got its name in the epic gold-rush days of '49, when a starved and decimated party of emigrants, who had struggled through it with infinite sufferings, looked back and gave it the sinister title that has clung to it to this day.

It was on a blazing midsummer day eighteen years ago, on July 10, 1913, that the official thermometer at Greenland Ranch recorded a temperature of 134 degrees Fahrenheit. This figure stood for nine years, two months and three days, until September 13, 1922, when the aforementioned Tripolitan town of Azizia sizzled itself up to 136 degrees in the shade—if any.

Both these figures are challenged by claimants of caloric honors for other hot spots on the earth. But Azizia remains champion, and Death Valley runner-up for world honors and champion of the Western Hemisphere, because these temperatures are official, obtained by certified thermometers in standard scientific mountings. To claims of higher temperatures elsewhere, it may be replied that thermometers exposed to the sun and to reflection from the sands, and possibly closer to the heated ground, might have shown greater temperatures on that hottest of recorded days in Death Valley. Dark ground absorbs and holds heat and hence warms up faster than the air above it: the enterprising Washington newspaper reporter who used to get a front-page story every August by breaking an egg on the Pennsylvania Avenue asphalt and letting it slowly fry there was only taking advantage of this well-known phenomenon of physics.

Consistent Performer

But Death Valley's claim to distinction is not based on a single spectacular day's work. Death Valley is a consistent performer. It delivers a very high average temperature year after year, and practically every summer it turns out a few days—or perhaps even weeks—of weather fit for old-timers to brag about. Though it must be a trifle discouraging to have it so hot that you can tell an incredible tale without having to lie.

It can do a handsome job in droughts, too. Months on end without the hundredth-inch sprinkle of rain that is the U. S. Weather Bureau's minimum requirement for a rainy day. When the rest of the country was parching in the great drought of 1930, Death Valley outdid itself. It had no recorded rain all year, and the drought overlapped on one end into December, 1929, and into January, 1931, on the other: 401 consecutive days on which no measurable precipitation occurred!

The whole story of Death Valley's climate has been made the subject of a thorough scientific examination by Ernest E. Eklund, of the Weather Bureau office in San Francisco.

The station where Mr. Eklund's data were obtained is at Greenland Ranch, a property of the Pacific Coast Borax Company. Here the Weather Bureau has installed its instruments, and employes of the company have been trained in attending them and keeping the records. It is one of many such "cooperative stations" maintained over the country.

That the name, Greenland Ranch, has nothing to do with the oft-sung "icy mountains" of the old hymn is amply demonstrated by the records—though ice is by no means unknown there in the winter. It refers more to the patch of cool greenness that relieves the iron hues of the desert at this place, where fields of alfalfa and a luxuriant grove of date palms drink from warm water in irrigation ditches. It is a true green land, welcome to the eyes of the traveler, wearied with the monotonous gray of desert vegetation or blinded by the staring white of the salt marshes.

The water that makes Greenland Ranch possible comes down from the mountains partly in a small stream known as Furnace Creek. Greenland Ranch is located at the "sink" of this stream, where it loses itself and disappears under the sands. The oasis is

A STUDY IN CONTRAST

The luxuriant foliage of Greenland Ranch, surrounded by the arid lands of the desert. It was the official Weather Bureau thermometer at this ranch that gave the record reading of 134 degrees Fahrenheit.

DEATH VALLEY BENEATH A GRIM GUARD

Furnace Mountains, one of the grim, desolate ranges that stand guard over the Valley. From these mountains comes the small creek that waters Greenland Ranch, the oasis of the Valley.

therefore known to many persons as Furnace Creek Ranch. This name again has nothing to do with the temperature, though it certainly seems more in keeping with the region than the alternative Greenland title. It refers to a number of rude ore-roasting furnaces found along its course by the pioneers of '49. These men thought the furnaces had been built by the even earlier Mormon pioneers, but the official historian of the Church of the Latter Day Saints states that he finds no records of any of Brigham Young's followers having sought minerals in Death Valley. It is more likely that the furnaces that gave the creek its name were built by Mexican miners.

Greenland Ranch was a bustling place in the old days, when the borax company's picturesque and much-advertised twenty-mule teams (really consisting of eighteen mules and a lead span of horses) freighted ponderous wagons of borax out of the valley. Now, however, better-paying borax beds have been discovered elsewhere, and mineral operations have been largely suspended. But large numbers of tourists now come to see the valley during the cooler months, so that there is still a good deal of life at the old ranch; and even in summer there are at least the caretakers, so that the weather record is kept complete, with not a hot day missing.

The Weather Bureau's cooperative station was established in 1911, so that accurate and complete records for twenty years are now available. Reviewing these records, Mr. Eklund said:

"High temperatures are by no means rare in Death Valley, judging from the records of Greenland Ranch, and it seems probable that even higher temperatures occur on the floor of the Valley, 98 feet lower than Greenland Ranch, considering the probable cooling effect of irrigated land and green vegetation at Greenland Ranch and the greater effect of insolation at the lower elevation. Extreme maximum temperatures of 120 degrees or higher have occurred at Greenland Ranch in every month from May to September, inclusive, and such temperatures have occurred there each year since the record began. In July, 1929, the mean maximum temperature was 119.5 degrees.

"Temperatures of 100 degrees or higher have occurred each month from March to October, inclusive, and temperatures of 85 degrees or higher have occurred during every month of the year. The average number of days with maximum temperature of 120 degrees or higher in June is 4, in July 10 and in August 5. In July and August, 1917, maximum temperatures of 120 degrees or higher were recorded on 43 consecutive days and during the same summer maximum temperatures of 100 degrees or higher were recorded on 113 consecutive days. This record was exceeded in 1916, however, when 126 consecutive days fell within this classification."

Gets Cold Too

But heat is not the whole story of the climate of Death Valley. It can get cold there, too. Mr. Eklund's study shows that the temperature often drops to freezing point or lower in the autumn and winter months. In December, January and February, 1928-1929, there were 72 freezing days in a row. On January 8, 1913, just six months before the memorable record-breaking 134-degree July day, a temperature of 15 degrees was recorded, and the following day a drop to only one degree higher. This marked the minimum for the whole twenty years of observation, as the 134 degrees marked the maximum.

But the ordinary autumn and winter temperatures in Death Valley are not so severe as that. It is during these seasons that most tourists now visit the valley, for there are good automobile roads and comfortable caravansaries there now, and the place has become so popular that the U. S. National Park Service has recently been making an intensive survey of the area, with the idea of setting it apart as a new National Monument or possibly even as a full-fledged National Park.

If the area does become a part of the great national system of outdoor nature observation and recreation areas, the crowds will come as their enthusiastic forerunners come today, in the winter, when such places as Yellowstone, Glacier and Rocky Mountain National Parks are blocked with snow. They will find the days warm, but the nights will be cool—"two-blanket" nights as a rule. The best tourist season is from October to April; after that there begin to be warm nights.

But winter or summer, the visitor to Death Valley can be reasonably sure of fair weather. Not every year can equal the record of the Great Drought of 1930 already mentioned, with its 401 rainless days, but there is seldom enough rain to spoil a picnic. When it does come, to be sure, it is apt to be a cloudburst, which may be dangerous if it catches you in a dry stream-bed. However, such uncomfortable phenomena are very rare.

Of Death Valley's rainlessness, Mr. Eklund says:

"Rainfall of 0.01 inch or more in 24 hours occurs on the average only seven times a year *(Turn to page 76)*

METALLURGY

Highly Purified Iron Made from Liquid

HIGHLY purified iron, possessing many of the qualities of copper, is prepared in Germany by a new process described recently by Dr. Ing. L. Schlecht.

Carbon monoxide of a high degree of purity is passed over hot iron, previously purified by ordinary methods. The two unite to form a liquid of relatively low boiling point, iron carbonyl. Heating this drives off the carbon and oxygen, leaving iron with hardly a trace of impurities, in an exceedingly finely powdered form. The individual spherical particles are only 20 millionths of an inch in diameter.

Heating this powder to a temperature of 1200 degrees Centigrade — twelve times as hot as boiling water — changes it into solid iron that resembles copper in its softness, resistance to corrosion and other properties. The process is declared to be applicable on a large scale, and the product to be much more useful than ordinary iron for many purposes.

Science News Letter, August 1, 1931

PSYCHOLOGY

Background of Black With White Letters Undesirable

PSYCHOLOGISTS advise against the use of white letters on a black background for lengthy advertising messages as a result of the determining at the University of Minnesota that it takes the reader about 10 per cent. longer to read material printed in this manner than it does to read similar material printed in the usual manner.

"The advertiser who contemplates utilizing white on black must decide whether or not the greater attention value of white on black through novelty will be sufficient to offset the disadvantage of a 10.5 per cent. difference in speed of reading," Drs. Donald G. Paterson and Miles A. Tinker say in the report of their investigation which will be published in a current issue of the Journal of Applied Psychology.

"Perhaps the best compromise would be to adopt the rule that whenever white on black is employed as a device for attracting attention, the amount of reading material should be reduced to a minimum so that the question of speed of reading the advertising text ceases to be a problem of any moment."

Another study conducted under the direction of Dr. Tinker by Grace Holmes disclosed the fact that black type can be read at a distance nearly fifteen per cent. greater than that at which white print is legible. Those taking part in the experiment reported that words in the white print appeared at a distance as a blur of white light with little or no definite form to the letters.

The psychologists believe that the superiority of the black type may be explained on the basis of the fact that we associate dark spaces with objects and light areas with intervening space. This would cause a person to pay attention to the black background rather than to the white letters which would appear merely as holes. Habit enters into the matter, too, for practically all reading requires the observation of black letters.

Science News Letter, August 1, 1931

PHYSIOLOGY

Lifelong Vegetarians Produce Less Bodily Heat

LIFELONG vegetarians have a lower minimum production of heat and expend less energy on vital bodily processes than normal persons, it appears from investigations which Prof. Glen Wakeham and Louis A. Hansen of the University of Colorado have reported to the magazine, *Science*.

The Colorado scientists determined the basal metabolic rate of nurses in training at a vegetarian sanitarium. This rate is the measure of the least heat produced by a person twelve hours or longer after his last meal and when he has been resting quietly in bed. It usually is taken early in the morning before breakfast.

Five of the pupil nurses were lifelong vegetarians, having never eaten meat of any kind in their lives. Ten girls had not eaten meat for five years or more. The girls who had never eaten meat had a slightly lower rate than the ten who had only been vegetarians for five years, but both groups had considerably lower rates than a group of non-vegetarian girls who were examined. However, the average rate of the non-meat eaters was not below what is generally considered the normal lower limit.

A long period of vegetarianism is necessary if the rate is to be noticeably reduced, the investigators reported.

Science News Letter, August 1, 1931

IN SCIENC

ORNITHOLOGY

Carrier Pigeon Has No Special Sense of Direction

HOW does the pigeon find his way home? Many of the theories heretofore advanced involve the idea of a special sense of direction, but experiments conducted by Dr. Ralph H. Gundlach, of the University of Washington indicate that the correct explanation is probably that these birds have good vision, wide cruising range, and some special motivation.

Dr. Gundlach constructed a maze in such a way that only a creature having a directional sense would be able to solve it. The experienced homers tested showed no sign of reaching a solution even after three months of trial. Another test was to release 16 trained racing homers on a course lying in a direction from home different from that of the course on which they were trained. These racers were accustomed to covering 100 miles in two hours on their home course. On the new one in which they had to find their way only three came home in less than five hours. Six were out from one to 14 nights, and two never came home.

Science News Letter, August 1, 1931

PUBLIC HEALTH

Not Enough Nurses For Contagious Diseases

A SHORTAGE of nurses competent and willing to care for patients suffering from communicable diseases like measles and scarlet fever is reported by the New York state department of health.

Only four out of every ten nurses in a group of more than 15,000 had had practical experience in caring for such patients, the committee on the grading of nursing schools found. Two out of every three schools do not even have a communicable disease service and do not affiliate with others to give their student nurses this type of training.

In one year New York graduated 1,453 nurses lacking this experience.

Science News Letter, August 1, 1931

NCE FIELDS

ARCHAEOLOGY

Unearthed Burials May Reveal Traits of Indians

WORD of important discoveries has just been received by the Bureau of American Ethnology from the largest archaeological excavation which the Bureau has ever attempted. The expedition, led by Dr. Frank H. H. Roberts, Jr., is working at an undisturbed prehistoric Indian site near Allentown, Arizona, and has just unearthed four burials and numerous pieces of pottery, weapons, and ornaments.

The objects so far uncovered give promise that, as the excavation progresses, hitherto unknown traits of Pueblo life 1,500 years ago will be revealed. The pottery and other relics provide some new angles for study of Pueblo culture.

Science News Letter, August 1, 1931

METEOROLOGY

Wanted—Reports of Ball Lightning Observations

BALL LIGHTING, one of the rarest, strangest and least understood of natural electrical phenomena, has recently been the subject of an unprecedented amount of discussion in scientific circles. In the hope of getting new light on this mysterious phenomenon, Dr. W. J. Humphreys, meteorological physicist of the U. S. Weather Bureau, wants reports from everybody who has ever observed it. He has given a list of questions on the subject to Science Service, with the request that observers of ball lightning send their answers to him, at the U. S. Weather Bureau, Washington, D. C.

Ball lightning is quite unlike the almost instantaneous electrical discharge that constitutes ordinary lightning. It is a slow, long-continuing discharge, that floats through the air or runs along the ground in the shape of a ball, or sometimes the shape of a pear. The color varies from red through blue to dazzling white.

These glowing balls often enter houses, coming down the chimney or entering through a window or door or even a crack. They float or glide around, sometimes with a fluttering or crackling noise, but seldom do any harm. There are no cases on record of persons injured by them; though Dr. Humphreys reports an amusing story that came to him of a too-curious pig that nosed one with his snout and was stunned when the ball literally "blew up in his face."

Dr. Humphreys' list of questions follows:

Who saw it? Names and addresses of all witnesses should be given.

Where and when was it seen? Location, date and time of day should be as exact as possible.

Did it come at the beginning, middle or end of the storm?

Did it occur indoors or out?

If indoors, how did it get in and how did it leave?

Was there one ball, or were there more than one?

How long did it last?

What were its size, shape and color?

Was its outline sharp or fuzzy?

Did it make any noise?

Did it leave an odor?

Did it move or stand still?

If moving, did it go with the wind or against it?

Was its movement vertical, horizontal or at an angle?

How fast did it move?

Was its movement smooth or in jerks?

What were its effects?

Dr. Humphreys is especially hopeful that some one may succeed in getting a photograph of a ball lightning discharge.

Science News Letter, August 1, 1931

ETHNOLOGY

Burials Bring Knowledge of Little-Known Ozark Life

DIGGING in a cave at Cedar Grove, Arkansas, an expedition from the Bureau of American Ethnology has discovered the burials of twelve individuals and hundreds of the tools, weapons, and beads that belonged to them.

First word of these results of the cave exploration has been received at the Bureau's headquarters. Judging from the list of discoveries, the U. S. National Museum will now have a collection of Ozark Indian relics equal to, or even greater than, any other collection in existence.

Science News Letter, August 1, 1931

PSYCHOLOGY

Emigrants Examined For Psychological Reaction

DOCTORS examining emigrants from England to Canada are instructed to pay special attention to psychological factors, according to the *Lancet*, British medical publication. The medical examination is required of all classes of emigrants desiring to live permanently in Canada. It is hoped that the examination will detect not only the obvious physical or mental defects in prospective emigrants, but also those persons who have defective judgment, unstable nervous systems, or who are emotionally oversensitive.

Release from restraining influences of the home environment is often too much for persons lacking in self-control or moral responsibility, the *Lancet* points out. The psychological stress of a complete change of environment is considerable. Comparative isolation in outlying districts; changes in money standard, food, cooking and dwellings; complete change in local interests and details of social life and activities; difference in customs and routine methods of doing business and work generally all tend to produce homesickness of such severity as to be really disabling.

Science News Letter, August 1, 1931

CHEMISTRY

Electrons Take Air Ride In New Electric Separation

ELECTROLYSIS, or electric separation of the elements in a chemical solution, is carried on in a new way by a process invented by Prof. Alfons Klemenc of the University of Vienna. The method promises results of great importance in research, and possibly also in industry.

In ordinary electrical separations, both positive and negative electrodes are immersed in the solution to be treated, and each takes out the atoms or atom-groups that are attracted to it. In Prof. Klemenc's process, the negative electrode is suspended above the surface of the liquid, and separated from it by an air space. When the current is turned on, a stream of electrons is given off by the electrode into the air.

The electrical phenomena that accompany this kind of electrolysis are quite different from those of ordinary electrolysis, Prof. Klemenc states.

Science News Letter, August 1, 1931

PHYSICS

Franklin and The Electric Phial

"A Classic of Science"

The Leyden Jar, Though Invented Accidentally in Holland, Owes its Explanation to America's Ubiquitous Scientist

EXPERIMENTS AND OBSERVATIONS ON ELECTRICITY, made at Philadelphia in America by Mr. Benjamin Franklin, and communicated in several letters to Mr. P. Collinson, of London. London: Printed and sold by E. Cave, at St. John's Gate, 1751.

July 28, 1747.

SIR,

The necessary trouble of copying long letters, which perhaps when they come to your hands may contain nothing new, or worth your reading (so quick is the progress made with you in Electricity) half discourages me from writing any more on that subject. Yet I cannot forbear adding a few observations on M. *Muschenbroek's* wonderful bottle.

1. The non-electric contain'd in the bottle differs when electrified from a non-electric electrified out of the bottle, in this: that the electrical fire of the latter is accumulated *on its surface,* and forms an electrical atmosphere round it of considerable extent: but the electrical fire is crouded *into the substance* of the former, the glass confining it.

2. At the same time that the wire and top of the bottle, &c. is electrified *positively* or *plus,* the bottom of the bottle is electrified *negatively* or *minus,* in exact proportion: *i.e.* whatever quantity of electrical fire is thrown in at top, an equal quantity goes out of the bottom. To understand this, suppose the common quantity of Electricity in each part of the bottle, before the operation begins, is equal to 20; and at every stroke of the tube, suppose a quantity equal to 1 is thrown in; then, after the first stroke, the quantity contain'd in the wire and upper part of the bottle will be 21, in the bottom 19. After the second, the upper part will have 22, the lower 18, and so on 'till after 20 strokes, the upper part will have a quantity of electrical fire equal to 40, the lower part none: and then the operation ends: for no more can be thrown into the upper part, when no more can be driven out of the lower part. If you attempt to throw more in, it is spued back thro' the wire, or flies out in loud cracks thro' the sides of the bottle.

3. The equilibrium cannot be restored in the bottle by *inward* communication or contact of the parts; but it must be done by a communication form'd *without* the bottle, between the top and bottom, by some non-electric, touching both at the same time; in which case it is restored with a violence and quickness inexpressible: or, touching each alternately, in which case the equilibrium is restored by degrees.

4. As no more electrical fire can be thrown into the top of the bottle, when all is driven out of the bottom, so in a bottle not yet electrified, none can be thrown into the top, when none *can* get out at the bottom; which happens either when the bottom is too thick, or when the bottle is placed on a electric *per se.* Again, when the bottle is electrified, but little of the electrical fire can be *drawn out* from the top, by touching the wire, unless an equal quantity can at the same time *get in* at the bottom. Thus, place an electrified bottle on clean glass or dry wax, and you will not, by touching the wire, get out the fire from the top. Place it on a non-electric, and touch the wire, you will get it out in a short time; but soonest when you form a direct communication as above.

So wonderfully are these two states of Electricity, the *plus* and *minus,* combined and balanced in this miraculous bottle! situated and related to each other in a manner that I can by no means comprehend! If it were possible that a bottle should in one part contain a quantity of air strongly comprest, and in another part a perfect vacuum, we know the equilibrium would be instantly restored *within.* But here we have a bottle containing at the same time a plenum of electrical fire, and a *vacuum* of the same fire; and yet the equilibrium cannot be restored between them but by a communication *without!* though the *plenum* presses violently to expand, and the hungry vacuum seems to attract as violently in order to be filled.

5. The shock to the nerves (or convulsion rather) is occasion'd by the sudden passing of the fire through the body in its way from the top to the bottom of the bottle. The fire takes the shortest course, as Mr. *Watson* justly observes: But it does not appear, from experiment, that, in order for a person to be shocked, a communication with the floor is necessary; for he that holds the bottle with one hand, and touches the wire with the other, will be shock'd as much, though his shoes be dry, or even standing on wax, as otherwise. And on the touch of the wire (or of the gun-barrel, which is the same thing) the fire does not proceed from the touching finger to the wire, as is supposed, but from the wire to the finger, and passes through the body to the other hand, and so into the bottom of the bottle.

Experiments Confirming the Above

EXPERIMENT I.

Place an electrical phial on wax; a small cork-ball suspended by a dry silk-thread held in your hand, and brought near to the wire, will first be attracted, and then repelled: when in this state of repellency, sink your hand, that the ball may be brought towards the bottom of the bottle; it will there be instantly and strongly attracted, 'till it has parted with its fire.

If the bottle had an electrical atmosphere, as well as the wire, an electrified cork would be repelled from one as well as from the other.

If You Have Pointed Ears

or hair on your chest, or if odors bring back vivid recollections of forgotten places, you are sharing with your brothers the animals family traits which once were as important to man as they are now to the forest creatures.

Darwin

describes these vestiges in the next CLASSIC OF SCIENCE

EXPERIMENT II.

Fig. 1. From a bent wire (*a*) sticking in the table, let a small linen thread (*b*) hang down within half an inch of the electrified phial (*c*). Touch the wire of the phial repeatedly with your finger, and at every touch you will see the thread instantly attracted by the bottle. (This is best done by a vinegar cruet, or some such belly'd bottle). As soon as you draw any fire out from the upper part by touching the wire, the lower part of the bottle draws an equal quantity in by the thread.

EXPERIMENT III

Fig. 2. Fix a wire in the lead, with which the bottom of the bottle is armed, (*d*) so as that bending upwards, its ring-end may be level with the top or ring-end of the wire in the cork (*e*), and at three or four inches distance. Then electricise the bottle, and place it on wax. If a cork suspended by a silk thread (*f*) hang between these two wires, it will play incessantly from one to the other, 'till the bottle is no longer electrised; that is, it fetches and carries fire from the top to the bottom of the bottle, 'till the equilibrium is restored.

EXPERIMENT IV

Place an electricised phial on wax; take a wire (*g*) in form of a *C*, the ends at such a distance when bent, as that the upper may touch the wire of the bottle, when the lower touches the bottom: stick the outer part on a stick of sealing wax (*h*) which will serve as a handle. Then apply the lower end to the bottom of the bottle, and gradually bring the upper-end near the wire in the cork. The consequence is, spark follows spark till the equilibrium is restored. Touch the top first, and on approaching the bottom with the other end, you have a constant stream of fire, from the wire entering the bottle. Touch the top and bottom together, and the equilibrium will soon be restored, but silently and imperceptibly; the crooked wire forming the communication.

EXPERIMENT V.

Let a ring of thin lead or paper surround a bottle (*i*), event at some distance from or above the bottom. From that ring let a wire proceed up, 'till it touch the wire of the cork (*k*). A bottle so fixt cannot by any means be electrised: the equilibrium is never destroyed: for while the communication between the upper and lower parts of the bottle is continued by the outside wire, the fire only circulates: what is driven out at bottom, is constantly supply'd from the top. Hence a bottle cannot be electrised that is foul or moist on the outside.

EXPERIMENT VI.

Place a man on a cake of wax, and present him the wire of the electrified phial to touch, you standing on the floor, and holding it in your hand. As often as he touches it, he will be electrified *plus*: and any one sttanding on the floor may draw a spark from him. The fire in this experiment passes out of the wire into him; and at the same time out of your hand into the bottom of the bottle.

EXPERIMENT VII

Give him the electrified phial to hold; and do you touch the wire; as often you touch it he will be electrified *minus,* and may draw a spark from any one standing on the floor. The fire now passes from the wire to you, and from him into the bottom of the bottle.

EXPERIMENT VIII

Lay two books on two glasses, back towards back, two or three inches distant. Set the electrified phial on one, and then touch the wire; that book will be electrified *minus;* the electrical fire being drawn out of it by the bottom of the bottle. Take off the bottle, and holding it in your hand, touch the other with the wire; that book will be electrised *plus;* the fire passing into it from the wire, and the bottle at the same time supply'd from your hand. A suspended small cork-ball will play between these books 'till equilibrium is restored.

EXPERIMENT IX

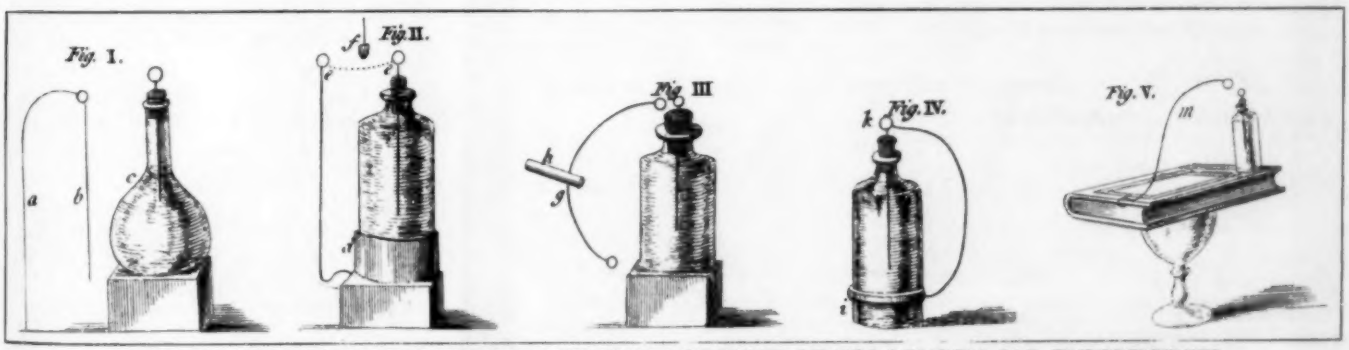
When a body is electrised *plus* it will repel an electrified feather or small cork-ball. When *minus* (or when in the common state) it will attract them, but stronger when *minus* than when in the common state, the difference being greater.

EXPERIMENT X.

Tho', as in Exper. VI. a man standing on wax may be electrised a number of times, by repeatedly touching the wire of an electrised bottle (held in the hand of one standing on the floor) he receiving the fire from the wire each time: yet holding it in his own hand, and touching the wire, tho' he draws a strong spark, and is violently shock'd, no Electricity remains in him; the fire only passing thro' him from the upper to the lower part of the bottle. Observe, before the shock, to let some one on the floor touch him to restore the equilibrium in his body; for in taking hold of the bottom of the bottle, he sometimes becomes a little electrised *minus,* which will continue after the shock; as would also any *plus* Electricity, which he might have given him before the shock. For, restoring the equilibruim in the bottle does not at all affect the Electricity in the man thro' whom the fire passes; that Electricity is neither increased nor diminish'd.

EXPERIMENT XI

The passing of the electrical fire from the upper to the lower part of the bottle, to restore the equilibrium is render'd strongly visible by the following pretty experiment. Take a book whose cover is filletted with gold; bend a wire of eight or ten inches long in the form (*m*) Fig. 5, slip it on the end of the cover of the book over the gold line, so as that the shoulder of it may press upon one end of the gold line, the ring up, but leaning towards the other end of the book. Lay the book on a glass



ILLUSTRATIONS IN BENJAMIN FRANKLIN'S ACCOUNT OF HIS LEYDEN JAR EXPERIMENTS

or wax; and on the other end of the gold lines, set the bottle electrised: then bend the springing wire, by pressing it with a stick of wax till its ring approaches the ring of the bottle wire; instantly there is a strong spark and a stroke, and the whole line of gold, which completes the communication between the top and bottom of the bottle, will appear a vivid flame, like the sharpest lightning. The closer the contact between the shoulder of the wire, and the gold at one end of the line, and between the bottom of the bottle and the gold at the other end, the better the experiment succeeds. The room should be darkened. If you would have the whol filletting round the cover appear in fire at once, let the bottle and wire touch the gold in the diagonally opposite corners.

I am, &c.

B. FRANKLIN.

Science News Letter, August 1, 1931

METALLURGY

Atoms Are Wanderers Even In Most Solid Metal

ATOMS, even the heavy atoms of lead, are wanderers. Prof. J. G. von Hevesy, of the University of Freiburg in Breisgau, has been investigating their properties. Lead atoms are constantly in motion, even in solid metal, he believes. In an alloy of lead and gold, at a temperature half again as high as that of boiling water, the atoms wander through a space of a hundredth of a cubic inch in a day. When there is nothing but lead in the lump, however, moving about is not nearly so easy.

Science News Letter, August 1, 1931

MEDICINE

Father Gives Baby Malaria By Blood Transfusion

THE DANGER of giving malaria by blood transfusion or by injections of whole blood for other purposes such as the prevention of measles was called to the attention of physicians by Dr. I. R. Jankelson of the Boston City Hospital in a report to the American Medical Association.

Dr. Jankelson described the case of a father who unwittingly gave malaria to his new-born baby in this way.

The father, an Italian, who had been living in Boston for the last twenty years, had been complaining of stomach trouble for nine or ten years. He was being treated for stomach ulcer with more or less success, careful examination having ruled out any other cause of his trouble.

At about that time his wife had a baby. This infant suffered from hemorrhages and in the course of treatment was given several ounces of the father's blood. The child developed malaria. Careful examination of the father's blood revealed the presence of the malaria parasite.

The father recalled that at the age of five, when he was living in Italy, he had had malaria, and that about once or twice a year he had a chill, lasting about one hour and followed by profuse perspiration.

Because a recipient of blood is usually in a precarious state of health, he is entitled to every safeguard against transmission of disease from the donor, Dr. Jankelson pointed out.

Science News Letter, August 1, 1931

CONVENIENCE COUPON

for New or Renewal Subscription to Science News Letter

Send this coupon to Washington while you are thinking of it.

Science News Letter,
21st and Constitution Avenue,
Washington, D. C.

Please { start / renew } my subscription to SCIENCE NEWS LETTER. I am enclosing remittance as checked below:

☐ 2 years, $7
☐ 1 year, $5

Name _____

Street Address _____

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If this subscription is a renewal, check here . . . . .

(From page 71) and the frequency of rainfall is not much greater if immeasurable amounts, or traces, are also included. In January, February and March, measurable rainfall occurs on the average one day each month while in practically all other months the average number of rainy days is considerably less than one-half. The greatest number of rainy days in one year was in 1913 when measurable rainfall occurred on 16 days and the least in 1929 when no rain, not even a trace, was recorded. The greatest number of rainy days in any one month was five in March, 1918, but the total monthly precipitation was only 0.75 inch.

"A daily rainfall of one inch or more has been recorded at Greenland Ranch only four times in nearly twenty years and the greatest amount ever recorded in 24 hours is 1.40 inches."

Old Tales Exaggerated

With so much heat and so little water, one would naturally expect to see the valley an absolute, staring desert, with no leaf or stem of plant life and not so much as an insect to speak for the animal kingdom. Such were the descriptions published by early California writers, who never took the trouble to visit the region, but relied on the tales of horror told by survivors of trapped pioneer trains, added to by their own imaginations.

But the fact is, that most of the floor of the valley is covered with vegetation. Several botanists have worked in the place, and their lists total somewhere in the neighborhood of 200 species, ranging from short-lived annuals to the tough and useful mesquite. Some of these, like sedges and cattails, live along the edges of streams that run down from the mountains and wander out, losing themselves in flat, marshy meadows. Others, however, bravely live on the dry upland, holding their gray-green leaves like defiant banners.

And where there are plants there are also animals. There is a special variety of the bighorn or mountain sheep that is found only in Death Valley and on its bordering mountain ranges. Threatened with extinction a few years ago, these animals are now given the benefit of an absolute closed season and are staging a hopeful come-back. There is an astonishing development of rodent life, including two most interesting fellows, the trade-rat or pack-rat and the long-legged, leaping kangaroo rat.

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Science News Letter, August 1, 1931

PUBLIC HEALTH

Hookworm, Foe of Progress, Still Burdens Many In South

Veteran of Hookworm Campaigns is Aroused Again by Findings of Resurvey of 19,000 Southern School Children

THE DISEASE of backwardness, hookworm, still has in its clutches one out of five school children in certain portions of the South, Dr. C. W. Stiles of the U. S. Public Health Service declared in a radio talk delivered under the auspices of Science Service, over the nationwide network of the Columbia Broadcasting System.

The dollars and cents meaning of this fact, particularly important in these days of economic depression, was stressed by Dr. Stiles, who pictured the hookworm as an enemy of the public pocketbook. Eradication of hookworm is a sound business proposition from the standpoint of the pocketbook of the family, of the school and of the taxes, he pointed out.

Over two decades ago, Dr. Stiles investigated the hookworm, discovered the American species and its widespread prevalence in the southern United States, and, with the backing of Rockefeller money, launched the campaign that has fought this "germ of backwardness" in every southern state and many foreign countries.

Today he is medical director of the National Institute of Health. He has just completed a resurvey of southern schools in which nearly 19,000 children were examined. He finds the hookworm still a burden upon the health and energies of the South.

Dr. Stiles described the schools he visited in this last survey. They covered 12 grades, some of the grades being divided into A, B, and C classes according to the pupils' mentality, scholarship or progress in studies.

About one-fourth, or 26 per cent., of the children in section A, the most advanced, showed signs of hookworm disease. Nearly half, 40 per cent, of the children in the intermediate B section showed symptoms of the disease. Over half, 85 per cent., of the children in the lowest section C showed the symptoms. In other words, the proportion of children infected with hookworm increased as their efficiency decreased. Hookworm disease is known to make for inefficiency and physical and mental backwardness and has been called the laziness disease.

Surveys by independent investigators outside the U. S. Public Health Service show that hookworm infection in a large part of the South is about half what it was when the Rockefeller Sanitary Commission started its work in 1909. At that time more than two million people were affected in the southern states. In some localities today as many as three-fourths of the school children are still infected.

The disease still remains an important factor which should not be ignored, in spite of the reduction in number and intensity of cases, Dr. Stiles concluded.

Science News Letter, August 1, 1931

DR. C. W. STILES

Who, though about to retire after 40 years of service fighting disease for the U. S. Government, is still active in voicing a new call to battle against hookworm

ARCHAEOLOGY

Evolution Believed Taught by Indians Long Before Darwin

TENNESSEE may cling to her anti-evolution law, thus officially protesting against newfangled scientific theories; yet long before Darwin, native Americans of the Southwest were teaching their children evolutionary ideas as a matter of course. This chapter of the ancient history of evolution in America is pointed out by Arthur Woodward, curator, Los Angeles Museum.

For centuries the Zuni Indians have believed in evolution. The evidence is their creation myths, and also ancient fetishes of stone carved in the form of animals.

"Frank Cushing, that immortal ethnologist and primal recorder of Zuni folklore, set down the Zuni tale of 'The Drying of the World' and the evolution of the Zuni from small, reptile-like forms to men who walked upright and lived as men," said Mr. Woodward.

"According to the Zuni, in early days men, or at least the ancestors of men, lived in the bottommost of four caves beneath the earth. Then, the Two Culture Heroes, sons of the great Sun Father, took pity on the people and by means of cane ladders permitted them to crawl from the lowest level to the next cave. Here it was a bit lighter and the people began to assume upright forms. They multiplied and became restless, seeking higher levels. In this second cave they learned more of speech and began assuming a tribal identity.

"By means of a third ladder they ascended to the third cave which was brighter, and here they began to long for the outer world. In each climbing some were left behind. In the fourth cave, those who could crawl up the cane ladder became full-fledged Zuni, having been taught the arts by the Twin Culture Heroes.

"However, the earth was then very moist, and strange creatures and man-eating animals roamed the wet surface."

The Two Culture Heroes allowed the spirits of the giant beasts to linger in the fossil remains.

Science News Letter, August 1, 1931

MEDICINE

Dental Decay May Depend on Physical Quality of Diet

SCORE ONE for the tooth brush and tooth paste manufacturers. The latest theory about what makes teeth decay upsets the explanation of food experts and goes back to the idea that teeth decay when food stays in them and decomposes, it appears from a report to the magazine *Science*, by C. A. Hoppert, P. A. Webber and T. L. Canniff of Michigan State College

What you eat probably affects the condition of your teeth, but it is the physical quality and consistency of food, rather than its chemical composition, that counts, these investigators think.

"The elimination from the diet of foods that are difficult to remove from the teeth would perhaps go far in wiping out dental caries," these investigators stated.

The foods that have plenty of vitamins and calcium, the so-called protective foods, also happen to be foods that do not stay in the teeth long. Milk, for instance, and other dairy products may owe their tooth strengthening properties as much to the fact that they don't stick in the teeth as to their lime and vitamins.

The fact that improvement in the condition of the teeth follows a change in diet to include more of these foods may be simply because the increased amount of "protective" foods necessarily reduces the consumption of the foods that tend to remain in the teeth and decompose and cause decay.

The Michigan investigators base their theory on observations on rats. In the first place, these animals do not often develop caries even when fed on diets lacking in factors supposedly essential for tooth development. But normal animals fed on the stock laboratory ration, designed to promote normal dental development and maintenance, were found with decaying teeth.

Further investigation showed that particles of the cornmeal, which formed a large part of the diet, lodged in the lower molar teeth. In a few weeks a small cavity appeared where the impaction of cornmeal had been. This encouraged more impaction of the cornmeal particles and more decay.

On the other hand, rats that were being fed a diet low in calcium and vitamins, but with oatmeal substituted for the cornmeal, had no decayed teeth, even though the teeth were relatively soft in structure. When oatmeal was substituted for corn meal in the stock ration, no decays were seen.

The size of the particle of cornmeal affected its tendency to lodge in the crevices of the teeth. Finely ground cornmeal that passed through a sixty-mesh screen had very little of this tendency, but forty-mesh screened cornmeal did stick in the teeth.

"It would appear desirable to give some attention in human dental studies to the physical properties of individual foods and of food mixtures with respect to their tendency for retention by the teeth," the investigators concluded. "It is apparent from the results that a diet considered adequate merely from the chemical point of view is not necessarily a guarantee against dental decay."

Science News Letter, August 1, 1931

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ENGINEERING

Design of Automobiles May Change Radically

AUTOMOBILE design is in for a radical change, recent reports to the Society of Automotive Engineers indicate. Through all the years of automobile history the cart has been before the horse, many engineers think.

Here is what they say is going to happen: The engine will be put at the rear, possibly crosswise; the body will be streamlined with a rounded blunt nose at the front tapering to a point at the rear.

Result: Because of reduced wind resistance less power will be required and less gas used; a car of the same length will have more passenger room; the driver will be at the front where he can see better; the engine and transmission will be more compact and accessible.

Science News Letter, August 1, 1931

BOTANY

Nature Ramblings

By FRANK THONE

Goldenrod

GOLDENROD, which is now at the height of its bloom, over most of the country, is a thing of beauty and therefore justified of itself. However, since Thomas Edison decided to give one species of it a tryout as a possible emergency rubber source, it has received advertising of a kind that has made it attractive to hard-boiled citizens, who think in terms of their pocketbooks.

However, despite the press-agenting it has received, goldenrod will still have to earn its way by its appeal to the eye. For Mr. Edison has stressed the fact that he does not expect even the best of his goldenrods to compete with tropical rubber trees under peace-time conditions, and that all he is hoping for is an emergency supply that can be raised domestically.

And only one species of goldenrod is involved at that, the one known to botanists as *Solidago leavenworthii*, native to the North Carolina lowland country. The eighty or so other species, that range pretty well all over the United States, either have too little rubber in them or else have not yet been tried out on Mr. Edison's farm.

One thing has long interfered with the proper appreciation of goldenrod by the people in general. That is the wholly erroneous belief that the flower causes a great deal of hay fever. Hay fever is at its height during goldenrod season, it is true, but it is not goldenrod pollen that causes it. Several other weeds, notably two species of ragweed, are in bloom at the same time, and shed great quantities of irritating pollen into the air. But because their flowers are inconspicuous nobody pays much attention to them, and the innocent bright flowers of goldenrod have to take the undeserved blame.

Science News Letter, August 1, 1931

MEDICINE

Artificial Gallstones Teach More About Painful Illness

GALLSTONES, often the cause of extremely painful illness, have been made in the laboratory by Professor Harry B. Weiser and George R. Gray, of the Rice Institute, Houston, Tex. These laboratory-made gallstones are very similar in appearance to the ones formed in the human body. This production throws light on how these stones are produced by nature.

Natural gallstones are composed of a fat called cholesterol, alkalies, calcium salts, and bile coloring matter. Just how these substances, all found in the body, are united to produce gallstones has long been a subject for investigation by scientists, and many complex theories have been evolved to explain the formation of these stones.

Calcium Precipitated

By using these same materials and applying certain principles of physical and colloid chemistry, Prof. Weiser and Mr. Gray were able to produce gallstones closely resembling the natural ones.

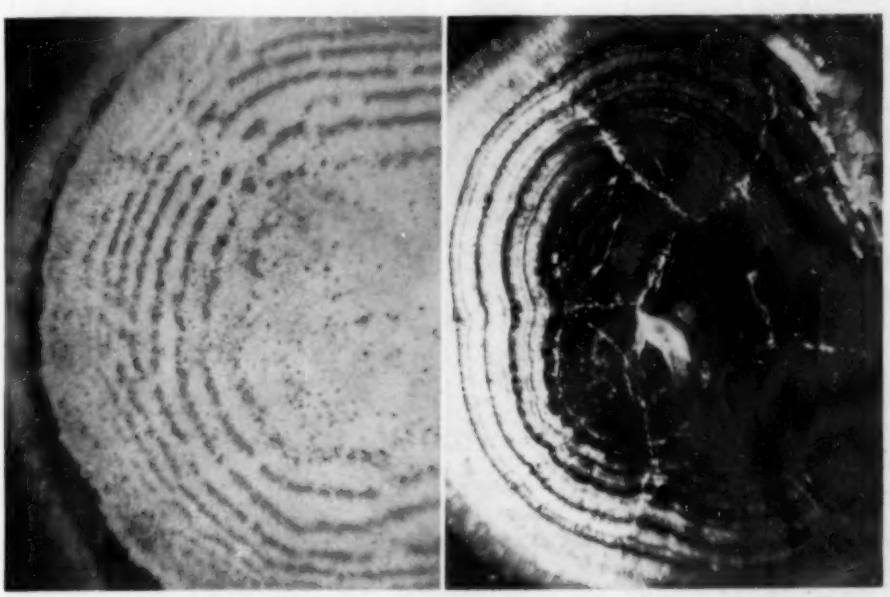
From their investigations, reported at the Ninth Colloid Symposium at Ohio State University, they concluded that the formation of gallstones of the type called "layered," proceeds somewhat as follows: Inflammation either starts the process, or at least favors it, by producing irreversibly precipitated protein materials, such as fibrin and albumin. Changes due to disease bring about the precipitation of cholesterol, carrying calcium with it.

The color substances of bile, which are finely divided particles suspended in the bile fluid, diffuse into this mass and are precipitated in the form of rhythmic bands.

The structure and arrangement of the bands is influenced by the shape of the mass, its density due to the pressure of other stones, and by variations in the composition of the bile fluid.

After the bands are formed, the stone may be invaded by radial crystallization of the cholesterol, cracks may develop, more cholesterol crystals may be deposited, or the stone may be changed in other ways, producing the wide variety of forms which are found in gall bladder disease and some of which the Houston investigators produced in their laboratory.

Science News Letter, August 1, 1931



ARTIFICAL AND NATURAL GALLSTONES

The one at the left is the first made in a laboratory. How nature makes stones like the one shown at the right has long been a puzzle to scientists. Experiments regarding gallstones were made at the Rice Institute.

...ICATION

• First Glances at New Books

Child Study

EXPERIMENTAL CHILD STUDY—Florence L. Goodenough and John E. Anderson—*Century*, 546 p., $3. Intended as a textbook, but useful and interesting to anyone wishing to make scientific observations of young children. A bibliography of 403 references adds greatly to the value of the book.

Science News Letter, August 1, 1931

Aeronautics

THE AIRCRAFT YEAR BOOK FOR 1931—Aeronautical Chamber of Commerce of America, Inc.—*Van Nostrand*, 607 p., $6. This is more than a statistical resumé of last year's progress in aeronautics, for it is a chapter of the rapidly-moving story of one of the world's newest industries. Remarkable photographs, drawings, maps and charts illustrate the volume.

Science News Letter, August 1, 1931

Medicine

INTERNATIONAL MEDICAL ANNUAL—Edited by Carey F. Coombs and A. Rendle Short—*Wood*, 551 p., $6. New and improved methods of diagnosis and treatment, developed during the past year, are presented by British authorities in the various fields. The material is arranged in dictionary fashion, making it especially handy for reference. The annual is in its forty-ninth year. Many illustrations and an index add to the book's value.

Science News Letter, August 1, 1931

Chemistry

FORMES CHIMIQUES DE TRANSITION—André Job—*Société d'Editions Scientifiques*, 340 p., 95 fr. A collection of Job's original scientific papers on the mechanism of chemical reactions, issued over the famous names of J. Perrin and G. Urbain.

Science News Letter, August 1, 1931

Public Health

HEALTH ON THE FARM AND IN THE VILLAGE—C.-E. A. Winslow—*Macmillan*, 281 p., $1. A review and evaluation of the Cattaraugus County Health Demonstration by an authority on public health which will be of value to all rural areas planning a health program. This demonstration seems to show according to Prof. Winslow, that the public health standards of the city may be brought to the country and that the farmer or villager may have as good protection of his health as the city dweller.

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Physics

PROBLEMS IN PHYSICS — Wm. D. Henderson — *McGraw-Hill*, 245 p., $2.25. These problems arose in the teaching of general physics to engineering students. With each set of problems illustrative examples and a brief statement of fundamental principles are given so that the demand on the instructor is at a minimum.

Science News Letter, August 1, 1931

Industrial Chemistry

DIE NEUEREUN FORTSCHRITTE DER TECHNISCHE ELEKTROLYSE—Jean Billiter—*Wilhelm Knapp*, 328 p., R. M. 22. A technological treatise for chemical engineers. The most recent advances in the preparation of metals and other products by electrical methods from water solutions and molten liquids are fully described. These methods are increasingly important in all branches of industry.

Science News Letter, August 1, 1931

General

LO!—Charles Fort—*Claude Kendall*, 411 p., $2.50. An entertaining potpourri of all sorts of strange and interesting reports which the credulous Mr. Fort has assembled to uphold his idea "that there exists a transportory force that I shall call Teleportation." If you enjoy being fooled by parlor tricks, this book will at least entertain you.

Science News Letter, August 1, 1931

Biography

MAKERS OF CHEMISTRY — E. J. Holmyard— *Clarendon Press*, 314 p., $2.50. A well illustrated story of the rise of chemistry from its remote and obscure beginnings up to establishment of the modern science by Lavoisier and Dalton. A brief description of developments of the last hundred years is attached. The book is written for the general reader but nevertheless shows evidence of research in the original authorities.

Science News Letter, August 1, 1931

Ethnography

HANDBOOK OF ETHNOGRAPHY—James G. Leyburn—*Yale University Press*. 323 p., $5. A very useful reference work which will fill a niche in the bookshelf of the anthropologist, ethnologist, or the student who deals in these subjects. Two-thirds of the book consist of "an alphabetical list of the more important peoples of the world, together with their locations, and a comment on geographical terms commonly used in ethnography." Following that is a table of peoples arranged under the political divisions of the world. And at the back is a set of very good maps of the continents on which the place names may be quickly located. The author's own trials and tribulations in checking up on casual references to peoples and places in the books he was consulting led him to compile this who's who and where of the world.

Science News Letter, August 1, 1931

Ornithology

THE AVIFAUNA OF THE GALAPAGOS ISLANDS—Harry S. Swarth—*California Academy of Sciences*, 299 p., map, $3. Since Darwin walked among their weird animals and was struck by one of the world's great ideas, the Galapagos islands have been classic ground to naturalists. The present work, bringing all available information about the bird life of the islands into one place and up to date, is therefore assured of a welcome.

Science News Letter, August 1, 1931

Archaeology

ARCHAEOLOGY OF THE ARKANSAS RIVER VALLEY—Warren King Moorehead—*Yale University Press*, 204 p., $4.00. The importance of the Arkansas Valley region in American archaeology is shown in this well planned publication. Prof. Moorehead describes changes in culture from point to point between the Mississippi and the Texas Panhandle and states conclusions and theories as to routes of prehistoric migration. A valuable addition to the volume is the appendix in which is reprinted "The Exploration of Jacobs Cavern" by Charles Peabody and W. K. Moorehead. The illustrations throughout are clear and informative.

Science News Letter, August 1, 1931

Metallurgy

SYNPOSIUM ON EFFECT OF TEMPERATURE ON THE PROPERTIES OF METALS—*American Society of Mechanical Engineers and American Society for Testing Materials*, 620 p., $1.50. These papers, which were delivered at a joint meeting held recently at Chicago, come from widely different sources and thus give a valuable survey of what is going on in this important industrial field. The symposium is divided into two parts.

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